Lewis & Clark Watershed webpage

PROJECT SUMMARY SHEET

PROJECT TITLE NAME: Lewis and Clark Initial Watershed Assessment
NAME AND ADDRESS OF LEAD PROJECT SPONSOR:

Randall Resource Conservation and Development
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STATE: South Dakota WATERSHED: Keya Paha HUC#: 10150006; Lewis and Clark Lake HUC# 10170101; Ponca HUC# 10150001

PROJECT TYPES : [] BASE [x] WATERSHED [] GROUNDWATER [] I&E

WATERBODY TYPES	NPS CATEGORY	
[ ] Groundwater	[x] Agriculture	[ ] Hydrologic modification
[x] Lakes/Reservoirs	[ ] Urban Runoff	[ ] Other
[x] Rivers	[ ] Silviculture	
[x] Streams	[ ] Construction	
[ ] Wetlands	[ ] Resource Extraction	
[ ] Other	[ ] Stowage and Land Disposal	

PROJECT LATITUDE 43.1 LONGITUDE -99.8

SUMMARIZATION OF MAJOR GOALS:

The goal of the Lewis and Clark Initial Watershed Assessment Project is to locate critical portions of the watersheds draining to Lewis and Clark Lake to be targeted for detailed analysis to be conducted in cooperation with the state of Nebraska beginning in 2004. TMDLs for impaired waters will be developed.

PROJECT DESCRIPTION:

The Keya Paha, Lewis and Clark Lake, and Ponca HUCs are all portions of the drainage that enter Lewis and Clark Lake on the Missouri River downstream of Fort Randall Dam. These drainages in combination with the Niobrara watershed in Nebraska drain approximately 10,158,000 acres, of which approximately 2,016,000 acres are located within South Dakota. Loads of suspended solids from these drainages have impaired recreation in Lewis and Clark Lake through sedimentation resulting in a reduction in the number of "useable" lake acres. The goal of this assessment is to locate the critical regions in these drainages so that a more detailed study may be conducted to determine exact sources of sediment loads as well as the potential restoration alternatives.

106 funds requested $ 273,500 Other Federal Funds $ 0

Local Match $15,600 Total project cost $289,100

Full Time Employee Equivalents 2

2.0 Statement of Need

2.1 Lewis and Clark Lake has been targeted for assessment as a result of strong local interest in protecting the resource. It also includes several waterbodies that have been identified on the South Dakota 303d list of impaired waterbodies that are targeted for TMDLs: Keya Paha River, Ponca Creek, Rahn Dam, and Roosevelt Dam.

In addition to providing recreational benefits for the region, Lewis and Clark Lake also provides drinking water to many communities located both in and outside of the watershed boundaries.

2.2 The watershed draining to Lewis and Clark Lake between Ft. Randall Dam and Gavins Point Dam is in excess of 10.1 million acres of which approximately 2 million are located in South Dakota. The watershed encompasses several HUCs including; Keya Paha HUC#: 10150006; Lewis and Clark Lake HUC# 10170101; Ponca HUC# 10150001.

The species listed in the federal list of threatened and endangered species are the bald eagle (Haliaeetus leucocephalus), which is listed as threatened, the american burying beetle, least tern, piping plover and the whooping crane which are listed as endangered. These species are not likely to be impacted by the assessment work of this project

2.3 See maps in following Figures

2.4 Land use in the watersheds is primarily cropland and grazing. Row crops and hay are the main crops on cultivated lands. Some animal feeding areas are located in the watershed as well as several small municipalities. The major soil associations found in the watershed are; Inavale-Cass, Anselmo-Tassel-Valentine, Anselmo-Valentine, Anselmo-Ronson, Anselmo-Holt, Doger-Elsmere, Matter-Rosebud-Huggins, Okaton-Manter, Homme-Ethan-Onita, Fluvents-Sarpy-Bon, Eltree-Alcester-Yankton, Egan-Wentworth-Ethan, Clarno-Crossplain-Houdek, Labu-Sansar-Boyd, Onita-Reliance-Ree, Holt-Vetal-Manter, Jansen-Ree-Meadin, Ree-Reliance-Mosher, Lohmiller-Glenberg-Haverson, Bon-Ethan-Davis, Highmore-Eakin-Raber, Homme-Ethan-Onita, Ethan-Glenham-Betts, Sansarc-Opal-Dupree, Agar-Lowry-Mobridge, Eakin-Highmore-Betts, Eakin-Degrey-Highmore, Highmore-Eakin-Raber, Beadle-Eakin-Jerauld, Delmont-Enet-Talmo, Boyd-Ethan-Crofton, and Clarno-Bonilla-Tetonka.

The average annual precipitation in the watershed is 20 to 21 inches of which 77% usually falls in April through September. Tornadoes and severe thunderstorms strike occasionally. These storms are local and of short duration and occasionally produce heavy rain fall events. The average seasonal snowfall is 36 inches per year.

2.5 The purpose of this assessment is to collect data that will be comparable with data collected in Nebraska during the same time frame which will provide a basis for developing a more comprehensive monitoring plan that will target the primary sources of sedimentation to Lewis and Clark Lake and result in mitigation strategies for these sources.

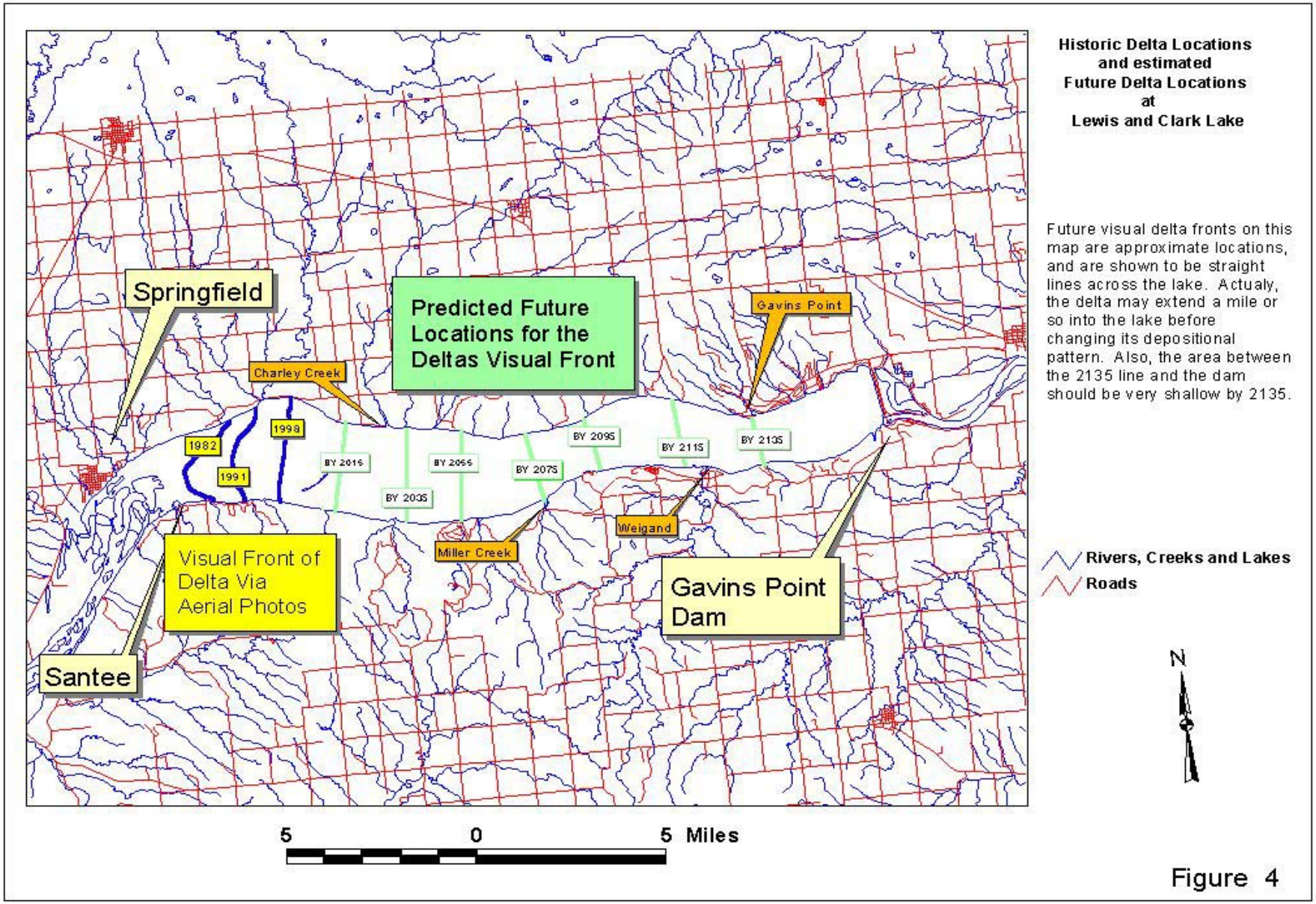

Figure 1. Historic and Future Visual Front of the Delta

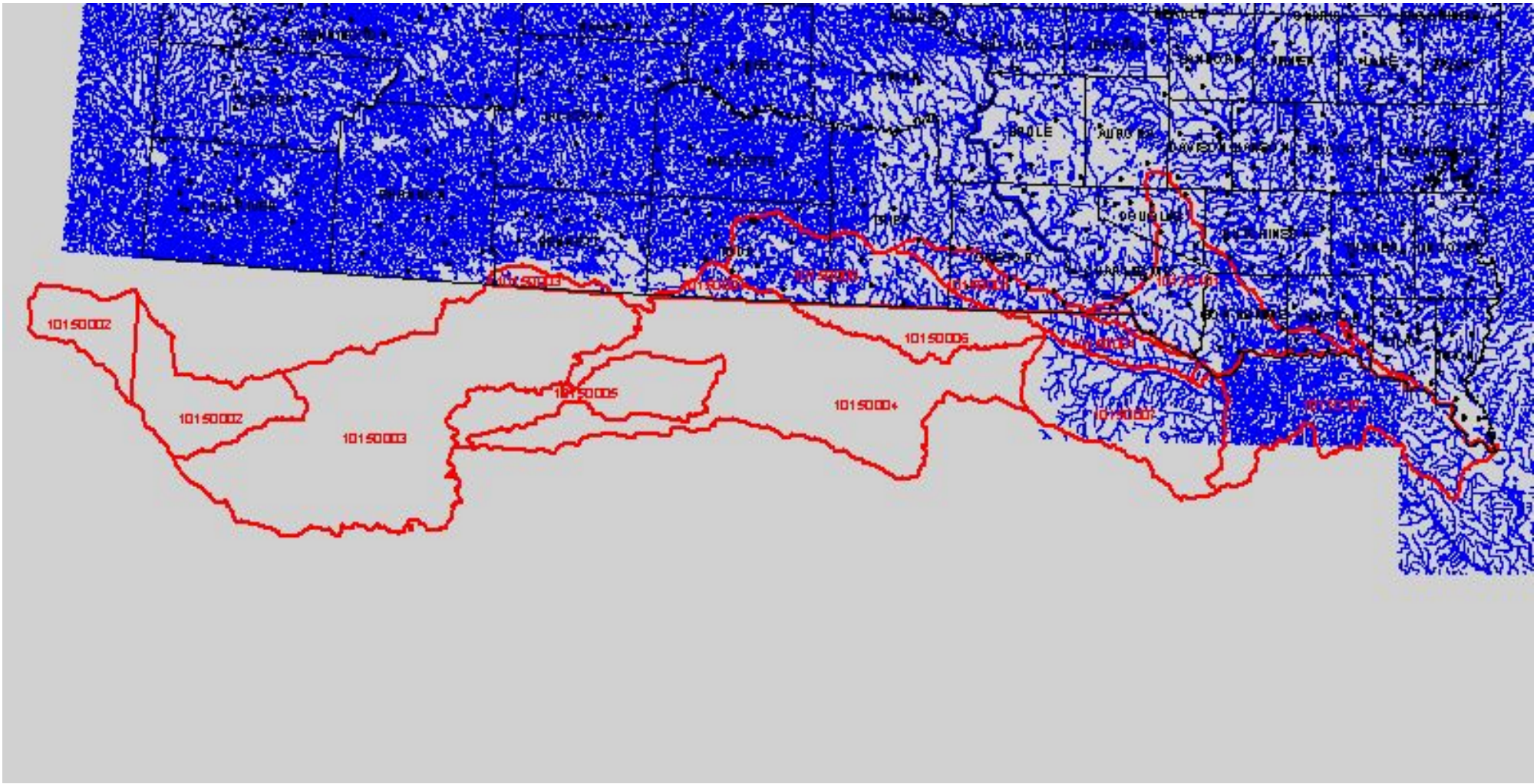

Figure 2. Lewis and Clark Drainage below Ft. Randall Dam

ASSESSMENT WORKPLAN

3.0 The Lewis and Clark Initial Watershed Assessment Project will provide background information needed to develop a more comprehensive monitoring plan and identify critical regions in the watershed and to develop a PIP targeting these areas for development of restoration alternatives. Development of the PIP will be done in cooperation with the State of Nebraska. It will be based on water quality data collected for this project and through water quality data collected throughout the Niobrara watershed in Nebraska as a part of their basin wide study conducted during the same time frame. Use of the Annualized Agricultural Non Point Source (AnnAGNPS) pollution model will also aid in determining critical regions for additional development.

3.1 OBJECTIVES AND TASKS

OBJECTIVE 1: This objective is to determine current annual load of nutrients and sediment to Lewis and Clark Lake and the Niobrara River. This information will be used to help determine critical regions throughout the drainage. The information will be collected at the sites listed in Table 1.

TASK 1 Installation of Gauging Equipment

Install water level recorders on 5 monitoring sites in 2003 and an additional 5 on TMDL lakes in 2004. At these sites the coordinator will maintain a continuous stage record for the project period, with the exception of winter months after freeze up. There are two USGS gauging stations located on the main channel of the Keya Paha River. No new gauging equipment will be needed for these sites and the discharge data will be gathered from USGS. These sites are LAC1 and LAC2. Additional gauges will be installed by the spring of 2004 at sites ROS1, ROS4, RHN1, RHN4, and RHN5.

TASK 2 Determine the annual water discharge at each site.

Discrete discharge measurements will be taken on a regular schedule and during storm surges. Discharge measurements will be taken with a hand held current velocity meter.

Discharges should be taken at different stages and frequently enough to develop a stage discharge rating curve. Discharge measurements and water level data (both collected during the project and historical data) will be used to calculate a hydrologic budget for the stream systems. This information will be used with concentrations of sediment and nutrients to calculate loadings from the watershed. As with the gauging equipment, no discharge measurements will need to be collected at the two USGS gauging sites.

TASK 3 Collect water quality samples from 12 tributary monitoring sites found in Table 1. Samples will be collected during spring runoff, storm events, and monthly base flows from April 14, 2003 through September 30, 2004. Lake samples will be collected from the Lake sites listed in Table 1 bimonthly during the growing season (May 15 through September 15) of 2004. Parameters to be analyzed at all sites may be found in Table 2.

TASK 4 Collect one elutriate sample from each of the TMDL lakes located in the assessment area (Rahn and Roosevelt).

Table 1 Monitoring Stations

Site Name	Type	Site Description
LAC1	*Tributary*	Main Channel of the Keya Paha River closest to the Todd and Tripp county line.
LAC2	*Tributary*	Main Channel of the Keya Paha River North of Wewela
LAC3	*Tributary*	Ponoca Creek Near the Nebraska State Line.
LAC4	*Tributary*	Slaughter Creek @ the Missouri River
LAC5	*Tributary*	Choteau Creek @ the Missouri River
LAC6	*Tributary*	Emanuel Creek @ the Missouri River
LAC7	*Tributary*	Snatch Creek @ the Missouri River
ROS1	*Tributary*	Outlet to Roosevelt Lake
ROS2	*Lake*	Deep inlake site in Roosevelt Lake
ROS3	*Lake*	Shallow inlake site in Roosevelt Lake
ROS4	*Tributary*	Inlet site to Roosevelt Lake
RHN1	*Tributary*	Outlet site to Rahn Dam
RHN2	*Lake*	Deep inlake site in Rahn Dam
RHN3	*Lake*	Shallow inlake site in Rahn Dam
RHN4	*Tributary*	Inlet Site to Rahn Dam
RHN5	*Tributary*	Outlet to Dog Ear Lake in Rahn Dam Watershed

Table 2. PARAMETERS MEASURED FOR TRIBUTARY SAMPLES:

PHYSICAL	CHEMICAL	Bacterial
Air temperature	Total solids	Fecal Coliform
Water temperature	Total susp. Solids	*E.coli*
Discharge	Dissolved oxygen	
Depth	Ammonia	
Visual observations	Un-ionized ammonia	
Water level	Nitrate-nitrite	
	TKN	
	Total phosphorus	
	Total dis. phosphorus	
	Volatile suspended solids	
	Field Ph	

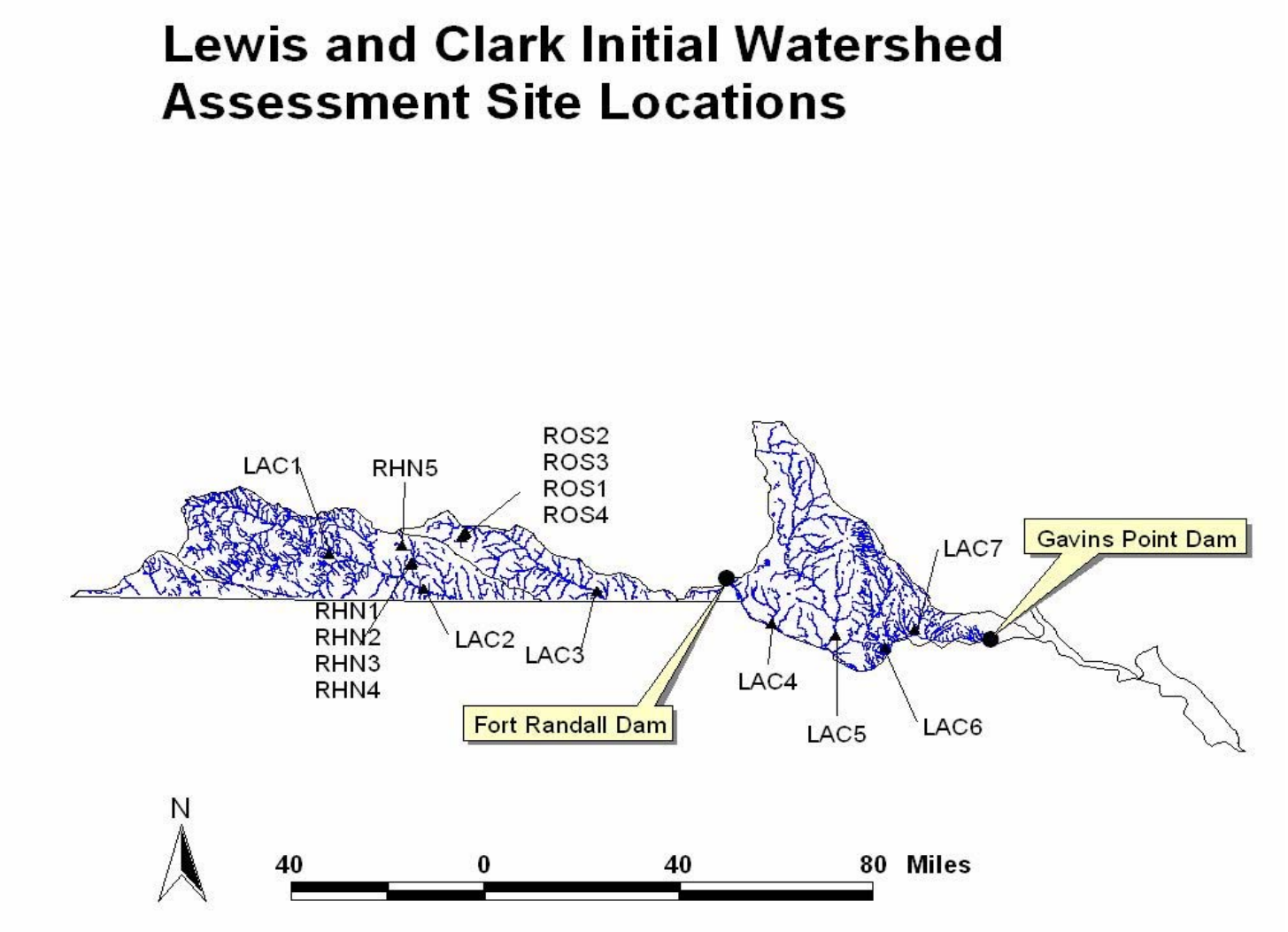

Figure 3. Lewis and Clark Initial Watershed Assessment Site Locations

OBJECTIVE 2: QA/QC

TASK 5 QA/QC Procedures for data collection

The collection of all field water quality data will be accomplished in accordance with the Standard Operating Procedures for Field Samplers, South Dakota Nonpoint Source Program.

The number of QA/QC samples is based on a minimum of 10 percent of all samples collected. If the proposed tributary sampling schedule is met, up to 19 blank and 19 replicate QA/QC samples will be collected for water chemistry samples.

All QA/QC activities will be conducted in accordance with the Nonpoint Source Program Quality Assurance Project Plan.

The activities involved with QA/QC procedures and the results of QA/QC monitoring will be compiled and reported on in a section of the final project report and in all project reports.

All samples will be collected using the methods described in the Standard Operating Procedures for Field Samplers by the State of South Dakota Water Resources Assistance Program.

OBJECTIVE 3: Evaluation of agricultural impacts to the water quality of the watershed through the use of the Annualized Agricultural Nonpoint Source (AnnAGNPS) model.

TASK 6 AnnAGNPS model data acquisition

The completion of the AnnAGNPS model will require the purchase of critical GIS based data layers including DLGs for Tripp and Gregory Counties which have an estimated cost of $136,000.

TASK 7 AnnAGNPS model execution

The Lewis and Clark watersheds will be modeled using the AnnAGNPS model. AnnAGNPS is a comprehensive land use model that estimates sediment and nutrient loss and delivery. The watersheds will be divided into subwatersheds and these will be compared on a load per acre basis to determine the most critical areas in the drainage.

Execution of the model will include the purchase of the required data layers identified in task 5. These layers along with the GIS

based data layers provided by SDDENR will be incorporated into the model.

This model will aid in the identification critical regions of nonpoint source pollution to the surface waters in the watersheds. Critical areas that are found will then be analyzed in depth to determine restoration alternatives.

Modeling efforts will be completed on lands located in Nebraska pending successful procurement of local funds from the associated NRDs and/or other entities located in the Nebraska portion of the watershed.

OBJECTIVE 4: Public Participation

TASK 8 Public participation and involvement will be provided for and encouraged.

Informational meetings will be held for the general public and co-cooperators of the project to inform all involved parties of progress on the study. These meetings will provide an avenue for input from the residents in the area.

News releases will be prepared and released to local news media in conjunction with the two meetings. These releases will be provided to local newspapers, radio stations and TV stations.

OBJECTIVE 5: Biological Monitoring

TASK 9 Benthic macroinvertebrate samples will be collected once during the project at each of the perennial tributary sites. A total of 7 samples will be collected for the sites LAC1 through LAC 7. Samples will be collected using either a D-net or a Courtemanch sampler. All samples will be collected during a fall index period during the project. The macroinveretebrates will be identified and enumerated by an independent contractor. These data will be compared to the various riparian measurements as well as other physical and chemical data and indices to ascertain relationships between these parameters and stream integrity.

OBJECTIVE 6 PIP Development

TASK 10 Sponsor's Reporting Duties

The sponsor will submit no more than monthly requests for payments along with documented work completed since the last voucher.

As the project data becomes available, a review of the historical and project data will be conducted. All data will be organized and a PIP will be developed to target critical regions for all basins in the study area, covering both SD and NE, for development of restoration alternatives. This PIP will also include the tasks required to complete data collection and develop TMDLs for listed waters located within the boundaries of this assessment. A final report covering the project area will be generated at the end of the final phase of the assessment.

TASK 11 Department's reporting duties

The department will assist in the development of the PIP for the second half of the study.

3.3 MILESTONE TABLE - see attached milestone.

3.4 No special permits are required to do this assessment project.

3.5 The Randall RC&D is the lead project sponsor for this project. Randall RC&D is important to this project because of its relationship with landowners and other groups/ agencies in the watersheds. The main problem with this watershed appears to be total suspended solids.

4.0 COORDINATION PLAN

4.1 The following groups/agencies have expressed support through an informal agreement to cooperate in the Lewis and Clark Inital Assessment Project. Additional entities such as the SD Department of Game, Fish and Parks may provide supplemental information.

Randall RC&D – Local Support and Lead Project Sponsor

South Dakota Department of Environment and Natural Resources – Local support and technical assistance.

Nebraska Department of Environmental Quality – Local support and technical assistance.

USDA Natural Resource Conservation Service – Support and technical assistance in acquiring soil data.

US Environmental Protection Agency –Financial support and technical assistance.

Lower James RC&D – Local Support

South Central RC&D – Local Support

South Central Water Development District – Local Support

Middle Niobrara Natural Resource District– Local Support

Lower Niobrara Natural Resource District– Local Support

Upper Elkhorn Natural Resource District– Local Support

Lewis and Clark Natural Resource District– Local Support

South Dakota Association of Conservation Districts – Local support and technical assistance.

Aurora Conservation District – Local Support

Bennett Conservation District – Local Support

Bon Homme Conservation District – Local Support

Charles Mix Conservation District – Local Support

Clearfield - Keyapaha Conservation District – Local Support.

Douglas Conservation District Local Support

Gregory Conservation District – Local Support

Hamill Conservation District – Local Support

Hutchinson Conservation District – Local Support

Tripp Conservation District – Local Support

Yankton Conservation District – Local Support

Knox County Board of Supervisors – Local Support

City of Springfield– Local Support

Village of Niobrara, Nebraska – Local Support

Yankton Area Chamber of Commerce – Local Support

Lewis and Clark South Dakota-Nebraska Preservation Association – Local Support

4.2 On November 13, 2002, the South Dakota DENR received a letter requesting staff assistance in drafting a proposal to deal with sedimentation issues in Lewis and Clark Reservoir on the Missouri River. The Randall RC&D was approached and agreed to accept the responsibility as local sponsor. Randall RC&D is a 501 (c) 3, non-profit organization whose membership consists of county commissions, towns, water development district, conservation districts and other non-profit organizations. Randall RC&D has assisted local entities to address watershed based natural resource concerns since 1964, making them an appropriate project sponsor.

4.3 Local organizations as well as the SD Nonpoint Source Task Force have expressed support for the Lewis and Clark Initial Watershed Assessment Project.

4.4 This project coordination will occur through frequent informal conversations with state, federal, and local government agencies and through quarterly meetings with the Randall RC&D.

4.5 There currently are no other agencies conducting assessment project activities on the Lewis and Clark watershed below Fort Randall Dam in South Dakota. A small portion of the watershed has been assessed through the South Central Lakes project and all data useful to both projects will be shared through public meetings and conversation between the coordinators.

The State of Nebraska will be conducting a basin wide study of all waters draining to Lewis and Clark Lake at the same time. Through an informal agreement with the Nebraska Department of Environmental Quality, a more comprehensive plan will be developed to address the sedimentation issues in the Lewis and Clark watershed from the data collected during the two assessments.

5.0 EVALUATION AND MONITORING PLAN

5.1 The monitoring strategy is explained in Section 3. The project will produce bi-annual progress reports. The sampling and analysis procedures required to complete the tasks within section 3 can be located in the Standard Operating Procedures for Field Samplers for the South Dakota Nonpoint Source Program (SOP). The specific locations of these sampling methods within the SOP as they pertain to each task are documented in Table 4 on the following page.

5.2 This assessment project consists of a combination of biological, chemical, hydrologic, and land use analyses. Stream discharge will be routinely measured. The chemical and physical parameters to be sampled during this project can be located in Table 2 and Table 3. Loads will be calculated based on the samples and data collected with the approved methods identified in the previous section. A PIP targeting critical regions in the drainage will be produced for areas in South Dakota and Nebraska.

5.3 All water quality monitoring will be done in accordance with the approved South Dakota Nonpoint Source Program Quality Assurance/Quality Control Project Plan and the Standard Operating Procedures for Field Samplers for the South Dakota Nonpoint Source Program.

5.4 Results from all water quality monitoring efforts under the Lewis and Clark Initial Watershed Watershed Assessment Project will be reported in the final project report. Data will be managed by the South Dakota Department of Environment and Natural Resources and maintained in a computer database. All sample data will be entered in the US EPA STORET Program by DENR. These data will be used as the foundation of a Section 319 Watershed Implementation Project proposal.

6.0 BUDGET

See attached budget pages

7.0 PUBLIC INVOLVEMENT

See Objective 4.

TABLE 4. Location of Sampling and Analysis Procedures for each applicable task involved with the Lewis and Clark Initial Watershed Assessment Project.

TASK NUMBER	TASK DESCRIPTION	ACTIVITY	REFERENCE IN SDWRA-2003 SOP
Task 2	Developing Annual Water Discharge	Collecting a discharge measurement	Section 12.0-4
Task 3	Collect Water Chemistry Samples	Tributary Sampling Procedures	Section 12.0 Section 14.0
Task 4	Sediment Analysis	Elutriate Sampling	Section 18.0
Task 5	Quality Assurance/Quality Control	Quality Assurance Quality Control Sampling	Section 8.0
Tasks 6-7	AGNPS Model Data Collection	AGNPS Model Data Collection	Section 13.0-1

Table 3. Lewis and Clark Initial Watershed Assesment Budget

Item	Total	Federal	Local
Sample Collection Salary (2080 hrs @ 15$/Hr)	$ 41,600.00	$ 41,600.00	
Modeling Salary (2080 hrs @ 15$/Hr)	$ 41,600.00	$ 26,000.00	$15,600.00
Equipment and Supplies (including DLGs)	$154,000.00	$ 154,000.00	
Samples (221@ $150/ each)	$ 33,150.00	$ 33,150.00	
Travel	$ 14,000.00	$ 14,000.00	
Elutriate Samples (2@ $1,500/ each)	$ 3,000.00	$ 3,000.00	
Biological Samples (7@ $250/ each)	$ 1,750.00	$ 1,750.00	
Totals	$289,100.00	$ 273,500.00	$15,600.00

Table 4 Lewis and Clark Initial Watershed Assessment Milestone Table

Lewis and Clark Initial Watershed Assessment Project **Milestone Chart** **2003-2004**	**Responsible Entity**	
		2003: A M J J A S O N D; 2004: J F M A M J J A S
Objective 1 - Tributary and Lake Sampling	Randall RC&D	
Objective 2 - QA/QC	Randall RC&D	
Objective 3 - ANNAGNPS	Randall RC&D	
Objective 4 - Public Participation	Randall RC&D	
Objective 5 - Biological Monitoring	Randall RC&D	
Objective 6 - PIP Development	Randall RC&D/ SDDENR/ NE DEQ	

SOUTH DAKOTA NONPOINT SOURCE PROGRAM
QUALITY ASSURANCE PROJECT PLAN

SUBMITTED BY:

SOUTH DAKOTA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF FINANCIAL AND TECHNICAL ASSISTANCE
WATER RESOURCES ASSISTANCE PROGRAM

Prepared by: Robert Smith
Feburary, 2001

Project Title: Lewis and Clark Initial Watershed Assessment Project

APPROVED BY:

South Dakota Watershed Protection Program Environmental Senior Scientist, Assessment Section	Date
South Dakota Watershed Protection Program Project Officer	Date
South Dakota Watershed Protection Program Quality Assurance Coordinator	Date
South Dakota DENR Quality Assurance Officer	Date